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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,451	05/21/2002	Igor Vladimir Khudyakov	A7728	5676

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EXAMINER	
MARKHAM, WESLEY D	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/030,451	KHUDYAKOV ET AL.
	Examiner	Art Unit
	Wesley D Markham	1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/16/04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed by the applicant on 4/22/2004, in which the specification of the instant application was amended and one (1) replacement sheet of drawings was submitted. Claims 1 – 20 are currently pending in U.S. Application Serial No. 10/030,451, and an Office Action on the merits follows.

Information Disclosure Statement

2. The IDS filed by the applicant on 3/16/2004 is acknowledged, and the references listed thereon have been considered by the examiner as indicated on the attached copy of the PTO-1449 form.

Drawings

3. The replacement sheet of drawings (1 sheet showing a single figure) filed by the applicant on 4/22/2004 is acknowledged and approved by the examiner. As such, the objection to the drawings set forth in paragraph 4 of the previous Office Action (i.e., the non-final Office Action mailed on 1/26/2004) is withdrawn.

Specification

4. The objections to the specification, set forth in paragraph 5 of the previous Office Action, are withdrawn in light of the applicant's amendment to correct various typographical errors / informalities and the applicant's remarks regarding the location

in the specification of proper antecedent basis for the claimed subject matter (i.e., the types of laser output(s)).

Claim Observations

5. Independent Claim 1 requires, in part, "a beam expander for expanding an output of the laser source". For the purposes of examination, the examiner notes that the aforementioned "beam expander" is not the same as and does not read on a so-called "beam splitter" which simply splits an incoming laser beam into two different outgoing laser beams and does not expand the beam. If the beam splitter also expands the diameter of the laser beam (i.e., as well as splitting the beam), it would qualify as a "beam expander", as required by the claims.
6. The point the examiner wishes to make is that splitting a laser beam, per-se, into multiple beams, is not the same as and does not read on expanding the laser beam in the context of the instant application.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Fejer et al. (USPN 4,650,322).

9. Regarding independent **Claim 1**, Fejer et al. teaches an apparatus for measuring changes in the diameter of a fiber, the apparatus comprising a laser source "20", a beam expander "22" for expanding the output of the laser source, a first lens "24" operable to focus an output of the beam expander on a target fiber "26", and a concave optical element "28" disposed on an opposite side of the target fiber relative to the beam expander and the first lens "24" (Abstract, Figure 2B, and Col.2, lines 55 – 68). Fejer et al. does not explicitly teach that the apparatus is "for photocuring a coating on a fiber", as recited in the preamble of Claim 1. However, this statement is simply a statement of intended use and is not given patentable weight in an apparatus claim. Further, since the apparatus of Fejer et al. is clearly capable of focusing laser light on a fiber (see Figure 2B and Col.2, lines 55 – 68), the apparatus is also capable of photocuring a coating on a fiber. Therefore, the apparatus of Fejer et al. anticipates the apparatus of Claim 1.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 9, 10, 12, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080).

13. Regarding independent **Claims 1 and 12**, Kruishoop teaches an apparatus and a method for photocuring a fiber / coating on a fiber (Abstract and Col.1, lines 11 – 26). The apparatus of Kruishoop comprises a laser source that emits UV-light (Col.1, lines 63 – 68, and Col.2, lines 1 – 13), an optical system for imaging the light source, the optical system comprising a plurality of lenses (Col.2, lines 14 – 15), and a concave optical element disposed on an opposite side of the fiber relative to the emitted light source (Figure 2, reference numbers "S_5" and "S_6", Col.2, lines 58 – 66, and Col.4, lines 37 – 46). The photocuring method of Kruishoop comprises focusing the light from the light source (e.g., the laser) into an elongate, quasi-linear image (i.e., a "strip of light", as required by Claim 12) onto a front side of the fiber (Col.1,

lines 54 – 68, and Col.2, lines 1 – 4 and 12 – 13), and reflecting the light rays which fall past the fiber onto a rear side of the fiber so that the maximum portion of the light rays are utilized in the curing process (Figure 2, reference numbers "S_5" and "S_6", Col.2, lines 58 – 66, and Col.4, lines 37 – 46). Regarding Claim 1, Kruishoop does not explicitly teach that the apparatus comprise (1) a beam expander for expanding the output of the laser source, and (2) a first lens operable to focus an output of the beam expander on a fiber. Specifically, Kruishoop is silent regarding the details of the optical system comprising a plurality of lenses used to image the light (i.e., to optically transform the light into a quasi-linear image that is focused onto the fiber). Osborne teaches an apparatus and a method specifically designed to focus a laser beam into a line (Abstract), the apparatus comprising a plurality of lenses (Figure 1, reference numbers "3" and "4"). The laser beam focusing apparatus of Osborne comprises a beam expander "2" for expanding an output of the laser source "1", and a first lens "3" operable to focus an output of the beam expander into a line (Figure 1, Col.2, lines 60 – 68, and Col.3, lines 1 – 32 and 66 – 68). It would have been obvious to one of ordinary skill in the art to utilize the laser beam focusing apparatus of Osborne as the optical focusing system in the photocuring apparatus of Kruishoop with the reasonable expectation of (1) success, as Kruishoop generally teaches using an optical system comprising a plurality of lenses for focusing light into a line, and the laser beam focusing apparatus of Osborne is a specific example of an optical system comprising a plurality of lenses specifically designed to focus light into a line (as desired by Kruishoop), and (2) obtaining the benefits of using the

optical system of Osborne, such as its relative simplicity in comparison to the mirror-based optical focusing system taught by Kruishoop. Regarding Claim 12, Kruishoop does not explicitly teach expanding a laser beam to produce an expanded diameter laser beam, which is then focused into a strip of light onto the fiber. However, Osborne teaches expanding a laser beam to produce an expanded diameter laser beam, and focusing the expanded diameter laser beam to a strip of light (Figure 1, Col.2, lines 60 – 68, and Col.3, lines 1 – 32 and 66 – 68). It would have been obvious to one of ordinary skill in the art to utilize the laser beam focusing process of Osborne to focus the laser light in the photocuring process of Kruishoop with the reasonable expectation of (1) success, as Kruishoop generally teaches using an optical system comprising a plurality of lenses for focusing light into a line, and the laser beam focusing process of Osborne is a specific example of a process specifically designed to focus laser light into a line (as desired by Kruishoop), and (2) obtaining the benefits of using the optical system / method of Osborne to focus the laser light into a line in the photocuring process of Kruishoop, such as its relative simplicity in comparison to the mirror-based optical focusing method taught by Kruishoop. Additionally, the combination of Kruishoop and Osborne does not explicitly teach that the strip of light (i.e., the laser beam focused into a line) has a diameter larger than a diameter of the fiber. Specifically, the aforementioned combination of references is silent regarding the relative diameters of the strip of light and the fiber. However, it is the desire of Kruishoop to cure the coating on the fiber as quickly as possible by (1) insuring that a substantially large portion of

emitted light is incident on the fiber (Col.1, lines 35 – 40 and 60 – 68, and Col.2, line 1) and (2) reflecting any light rays which fall past the fiber back towards the fiber so that they become incident on the fiber (Col.2, lines 58 – 66). Therefore, it would have been obvious to one of ordinary skill in the art to focus the laser beam into a line having a diameter larger than a diameter of the fiber with the reasonable expectation of successfully and advantageously insuring that a large portion of emitted light is incident on the fiber (i.e., to insure that the entire fiber is exposed to the strip of laser light) and allowing any light rays which fall past the fiber to be reflected back towards the fiber in order to achieve a high curing speed, as desired by Kruishoop. Regarding **Claims 9 and 10**, the combination of Kruishoop and Osborne also teaches that the apparatus further comprise a second lens disposed between the first lens and the concave optical element (Claim 9), the second lens comprising a cylindrical lens (Claim 10) (Figure 1, reference number "5", and Col.3, lines 11 – 20 of Osborne). Regarding **Claim 19**, the combination of Kruishoop and Osborne also teaches that the laser source outputs radiation in a UV radiation range (Col.2, lines 12 – 13 of Kruishoop).

14. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of either Ortiz, Jr. (USPN 4,958,900) or Kato (USPN 4,566,762).

15. The combination of Kruishoop and Osborne teaches all the limitations of **Claim 2** as set forth above in paragraph 13, except for an apparatus wherein the first lens

comprises a plano-concave lens with a planar side disposed towards the beam expander. Specifically, the first lens of the optical focusing system of Osborne is a converging lens of the meniscus type (Figure 1, reference number "3", and Col.3, lines 7 – 11). Both Ortiz, Jr. (Figures 1 and 2, reference number "42", and Col.2, lines 27 – 30) and Kato (Figure 4A, reference number "21a", and Col.5, lines 52 – 53) teach that lenses comprising a plano-concave lens having a planar side disposed towards a light beam source can be utilized as converging lenses. It would have been obvious to one of ordinary skill in the art to incorporate a lens comprising a plano-concave lens with the planar side disposed towards the beam expander of Osborne in the apparatus of the combination of Kruishoop and Osborne (i.e., as opposed to the meniscus type lens taught by Osborne) with the reasonable expectation of success and obtaining similar results (i.e., successfully providing a known type of converging lens in the apparatus of the combination of Kruishoop and Osborne, regardless of whether the converging lens is a meniscus type lens or a plano-concave lens).

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Petisce(1) (USPN 5,015,068) and Yamada et al. (USPN 6,033,829).

17. The combination of Kruishoop and Osborne teaches all the limitations of **Claim 3** as set forth above in paragraph 13, except for an apparatus wherein the laser source outputs radiation in a visible light range. Specifically, the laser of Kruishoop emits

radiation in a UV-light range (Col.2, lines 12 – 13) and is used to cure a UV-curable coating on an optical fiber (Col.1, lines 11 – 26). Additionally, Kruishoop teaches that curing is the slowest step in the process, which means that the feed-through rate of the fiber is dictated by the curing speed (Col.1, lines 35 – 37). Petisce(1) teaches that, in the art of coating and curing optical fibers, higher curing speeds can be obtained by utilizing inner and outer coating layers that are cured by exposure to different portions of the light spectrum, specifically an inner layer that is cured by visible light and an outer layer that is cured by ultraviolet light (Abstract, Col.2, lines 61 – 68, Col.3, lines 1 – 20, Col.4, lines 25 – 68, and Col.5, lines 21 – 26). Yamada et al. teaches that it was known in the art at the time of the applicant's invention to cure photopolymerizable compositions by exposure to visible light emitted from visible light lasers (Col.2, lines 17 – 25 and Col.10, lines 48 – 58). It would have been obvious to one of ordinary skill in the art to incorporate a visible light laser source (as well as the corresponding focusing means taught by Osborne) in the apparatus of the combination of Kruishoop and Osborne so that the apparatus would be capable of curing visible-light curable coatings on optical fibers (as taught by Petisce(1)) as well as UV-light curable coatings, thereby increasing the speed of the curing process and the feed-through rate of the fiber, as desired by Kruishoop.

18. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view

of Petisce(1) (USPN 5,015,068) and Yamada et al. (USPN 6,033,829), and in further view of Tausch et al. (USPN 6,078,713).

19. The combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. teaches all the limitations of **Claims 4 and 14** as set forth above in paragraphs 13 and 17, except for an apparatus / method wherein the laser source is a <u>continuous wave</u> laser (i.e., a laser continuously outputting light). Regarding Claim 14, please note that the combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. teaches utilizing a laser beam that outputs light in a visible portion of the electromagnetic spectrum (see paragraph 17 above). Additionally, the aforementioned combination of references is silent regarding whether the laser source is a continuous wave laser or not. However, there are only two possible choices in this matter – the laser can be either a continuous wave laser or a pulsed laser. Tausch et al. teaches that it was known in the art at the time of the applicant's invention to utilize either a pulsed laser or continuous wave (cw) laser light source in order to cure photoinitiated coatings (Col.2, lines 1 – 5). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a continuous wave laser (i.e., a laser continuously outputting light) in the process and apparatus of the combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. with the reasonable expectation of (1) success, as Tausch et al. teaches that a cw laser can be utilized to cure coatings, and (2) obtaining similar results (i.e., curing the coating on the optical fiber), regardless of whether a pulsed laser or a cw laser is utilized.

20. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Petisce(1) (USPN 5,015,068) and Yamada et al. (USPN 6,033,829), and in further view of Akerman et al. (EP 0 202 803 A2).

21. The combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. teaches all the limitations of **Claims 5 and 15** as set forth above in paragraphs 13 and 17, except for an apparatus / method wherein the laser source is a pulsed laser (i.e., a laser outputting pulses of light). Regarding Claim 15, please note that the combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. teaches utilizing a laser beam that outputs light in a visible portion of the electromagnetic spectrum (see paragraph 17 above). Additionally, the aforementioned combination of references is silent regarding whether the laser source is a pulsed laser or not. However, there are only two possible choices in this matter – the laser can be either a continuous wave laser or a pulsed laser. Akerman et al. teaches that, in the art of curing polymeric coatings by utilizing laser irradiation, the total energy required to cure a coating can be markedly reduced by using pulsed laser light (Abstract, page 2, lines 30 – 34, and page 3, lines 1 – 8). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a pulsed laser (i.e., a laser outputting pulses of light) in the process and apparatus of the combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. with the reasonable expectation of successfully and advantageously reducing the total energy required to cure the optical fiber coating, thereby making the process more economical.

22. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Petisce(2) (USPN 5,000,772).

23. The combination of Kruishoop and Osborne teaches all the limitations of **Claims 6 and 13** as set forth above in paragraph 13, except for an apparatus / method further comprising a <u>magnetic field source</u> operable to apply a magnetic field about the fiber, and applying a magnetic field around the fiber. However, Kruishoop does teach that curing is the slowest step in the process, which means that the feed-through rate of the fiber is dictated by the curing speed (Col.1, lines 35 – 37). Petisce(2) teaches that, by incorporating a magnetic field source operable to apply a magnetic field about an optical fiber in an optical fiber curing apparatus, and applying a magnetic field around the fiber, the optical fiber curing speed can be increased, thereby providing an overall increase in manufacturing line speed (Abstract, Col.2, lines 32 – 44, Col.5, lines 55 – 59, and Col.6, lines 30 – 60). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate a magnetic field source into the curing apparatus of the combination of Kruishoop and Osborne and to use this source to apply a magnetic field around the fiber with the reasonable expectation of successfully and advantageously increasing the optical fiber curing speed, thereby increasing the overall optical fiber manufacturing line speed, as desired by Kruishoop.

24. Claims 7, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Akerman et al. (EP 0 202 803 A2).

25. The combination of Kruishoop and Osborne teaches all the limitations of **Claims 7, 11, and 18** as set forth above in paragraph 13, except for an apparatus and method wherein the laser source is disposed at least 2 meters away from the fiber. Specifically, the combination of Kruishoop and Osborne is silent regarding the relative distance between the laser source and the fiber. However, Akerman et al. teaches that, in the art of curing coatings by using a laser beam, the laser source may be placed remote from the coating location since its light output is easily transmitted long distances (page 4, lines 24 – 28). Therefore, it would have been obvious to one of ordinary skill in the art to dispose the laser source of the combination of Kruishoop and Osborne "remote from the coating location" (i.e., remote from the fiber), including at a long distance of at least 2 meters from the fiber, with the reasonable expectation of (1) success, as laser light is easily transmitted long distances, and (2) obtaining the benefits of locating the laser a long distance from the fiber, such as (a) not physically interfering with the moving optical fiber and (b) reducing the risk of contaminating the laser source with volatile components that are emitted from the fiber coating during the curing process. The exact distance between the fiber and the laser source would have been chosen by the purveyor in the art depending upon various process and apparatus constraints (e.g., where it is most feasible to mount the laser source).

26. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Petisce(2) (USPN 5,000,772), and in further view of Tausch et al. (USPN 6,078,713) and Field et al. (USPN 6,195,486 B1).

27. The combination of Kruishoop, Osborne, and Petisce(2) teaches all the limitations of **Claim 8** as set forth above in paragraphs 13 and 23, except for a method wherein the laser source is a continuous wave laser emitting light in the UV range between 300 and 400 nm. However, the laser source of Kruishoop is a UV-laser in general (Col.2, lines 12 – 13), and Field et al. teaches that UV-light is considered to have a wavelength of about 200 – 400 nm (i.e., a range overlapping the applicant's claimed range) in the art of light curable resins (Col.5, lines 37 – 57). Additionally, the combination of Kruishoop, Osborne, and Petisce(2) is silent regarding whether the laser source is a continuous wave laser or not. However, there are only two possible choices in this matter – the laser can be either a continuous wave laser or a pulsed laser. Tausch et al. teaches that it was known in the art at the time of the applicant's invention to utilize either a pulsed laser or continuous wave (cw) laser light source in order to cure photoinitiated coatings (Col.2, lines 1 – 5). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a continuous wave laser (i.e., a laser continuously outputting light) emitting at a UV-wavelength of between 300 and 400 nm in the process and apparatus of the combination of Kruishoop, Osborne, and Petisce(2) with the reasonable expectation of (1) success, as Tausch et al.

teaches that a cw laser can be utilized to cure coatings, and Field et al. teaches that UV-light is considered to have a wavelength of about 200 – 400 nm (i.e., a range overlapping the applicant's claimed range) in the art of light curable resins, and (2) obtaining similar results (i.e., curing the coating on the optical fiber), regardless of whether a pulsed laser or a cw laser is utilized.

28. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view of Field et al. (USPN 6,195,486 B1).
29. The combination of Kruishoop and Osborne teaches all the limitations of **Claim 16** as set forth above in paragraph 13, except for a method wherein the laser beam emits in the range of 300 – 400 nm. However, the laser source of Kruishoop is a UV-laser in general (Col.2, lines 12 – 13). Field et al. teaches that UV-light is considered to have a wavelength of about 200 – 400 nm (i.e., a range overlapping the applicant's claimed range) in the art of light curable resins (Col.5, lines 37 – 57). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a laser that emits in the claimed range of 300 – 400 nm in the process of the combination of Kruishoop and Osborne because such a wavelength range is encompassed by the wavelength of UV-light (as taught by Field et al.), and Kruishoop teaches using a UV-light emitting laser in general.
30. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kruishoop (USPN 4,849,640) in view of Osborne (USPN 4,069,080), in further view

of Petisce(1) (USPN 5,015,068), Yamada et al. (USPN 6,033,829), and Field et al. (USPN 6,195,486 B1).

31. The combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. teaches all the limitations of **Claims 17 and 20** as set forth above in paragraphs 13 and 17, except for a method / apparatus wherein the laser source emits radiation in the range of 400 – 800 nm. However, the aforementioned combination of references reasonably suggests using a laser light source that emits in the visible portion of the spectrum in general (see paragraph 17 above). Field et al. teaches that visible light is considered to have a wavelength of about 400 – 700 nm (i.e., a range lying entirely within the applicant's claimed range) in the art of light curable resins (Col.5, lines 37 – 57). It would have been obvious to one of ordinary skill in the art to utilize a laser that emits in the claimed range of 400 – 800 nm in the process and apparatus of the combination of Kruishoop, Osborne, Petisce(1), and Yamada et al. because the aforementioned combination of references teaches using a visible light laser in general, and Field et al. teaches that visible light is considered to have a wavelength of about 400 – 700 nm (i.e., a range lying entirely within the applicant's claimed range) in the art of light curable resins.

Response to Arguments

32. Applicant's arguments filed on 4/22/2004 have been fully considered but they are not persuasive.

33. First and regarding the Fejer reference, the applicant argues that the spherical doublet “28” (see Figure 2B) does not correspond to a concave optical element (as required by Claim 1), and the internally illustrated aspect of the lens is not sufficient to describe the doublet “28” as a concave lens element with any degree of certainty (i.e., the degree necessary to support an anticipation rejection). In response, this argument is not convincing. Figure 2B clearly shows that the interface between the two portions of the spherical doublet “28” is not linear (i.e., it is curved). Therefore, one surface of the interface of the doublet must be convex, and the other surface of the interface of the doublet must be concave. As such, the doublet “28” is reasonably construed by the examiner to be a “concave optical element”. The examiner’s anticipation rejection is not based on possibilities or probabilities, but is based on what the reference fairly teaches to one of ordinary skill in the art.
34. Second and regarding the applicant’s argument toward the “intended use” of the apparatus, the examiner maintains that Fejer teaches each and every feature of the claim.
35. Third, the applicant argues that the laser light of Fejer is used to measure a fiber diameter during formation, and to contend that such light would also be able to adjust a physical characteristic, such as by curing, would be contradictory to the device’s ability to measure the fiber diameter with any consistency. In response, the applicant’s above argument that laser light, such as that taught by Fejer, used to measure a fiber diameter could not also be used to cure a coating on a fiber appears to be merely speculation and is not supported on the record by any art or evidence.

Further, the examiner notes that none of the applicant's claims appear to require any specific laser beam intensity, and if the applicant is arguing that a given intensity is required to photocure an optical fiber coating, such a limitation would be deemed essential to the claimed subject matter and must be present in the claims for compliance with 35 U.S.C. 112. The examiner maintains that the He-Ne laser light emitted and focused onto a fiber (as taught by Fejer) would be capable of photocuring a coating on a fiber. Please note that the applicant's claim is open to photocuring any coating on a fiber to any degree and at any rate. At the very least, the laser beam of Fejer would be capable of slowly curing a coating on a fiber to a relatively low degree so long as the coating is sensitive to the wavelength of radiation emitted by the laser. Thus, the apparatus of Fejer is capable of "photocuring a coating on a fiber".

36. Regarding the 35 U.S.C. 103(a) rejections based on the combination of Kruishoop and Osborne, the applicant first argues that Osborne is non-analogous art. In response to this argument, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Osborne is reasonably pertinent to a particular problem with which the applicant was concerned, specifically the problem of focusing a laser beam into a linear form by using a specific combination of optical elements (e.g. lenses). The fact that Osborne does so to treat

polymeric materials, while the applicant does so to cure optical fiber coatings does not render Osborne non-analogous art.

37. Second, the applicant argues that Kruishoop and Osborne teach away from their combination with each other because Kruishoop contemplates the use of mirrors rather than lenses. The applicant then mentions various advantages obtained by using mirrors instead of lenses in the process of Kruishoop. In response, this argument is not convincing. To begin, the examiner does not dispute the applicant's assertion that Kruishoop prefers using mirrors to lenses (see Abstract). However, the overall goal of Kruishoop is to provide an apparatus and method that can transform light (e.g., laser light) into a linear image focused on a fiber in order to cure a fiber coating. Importantly, Kruishoop explicitly teaches that an optical system for performing the method may comprise a plurality of lenses (Col.2, lines 14 – 15), but is silent regarding the exact location and positioning of such lenses. Osborne explicitly teaches an arrangement of lenses that is designed to focus laser light into a linear form, and therefore, one of ordinary skill in the art would clearly be motivated to combine the Kruishoop and Osborne references in the manner done so by the examiner. In no way do Kruishoop and Osborne teach away from their combination, as asserted by the applicant. The examiner notes that the teachings of a reference are not limited to its preferred embodiments.

38. Third, the applicant argues that there is no motivation to combine Kruishoop and Osborne, as such a combination would provide much poorer results, and the linear arrangement taught by Osborne precludes the folded arrangement favored by

Kruishoop. In response, this argument is not convincing. Again, the examiner agrees that the utilization of mirrors (i.e., that provide a "folded" radiation path) is preferred by Kruishoop. However, Kruishoop explicitly teaches that an optical system for performing the method may comprise a plurality of lenses (Col.2, lines 14 – 15), albeit in a less preferred embodiment. Since Kruishoop is silent regarding the arrangement of lenses necessary to achieve the goal of focusing laser light into a linear form, one of ordinary skill in the art would have been motivated to seek-out such a suitable arrangement of lenses. The arrangement of lenses taught by Osborne is specifically designed to focus laser light into a linear form. Therefore, one of ordinary skill in the art would have been motivated to use the arrangement of lenses and optical elements of Osborne to focus laser light into a linear form (and onto the optical fiber of Kruishoop) in the process of Kruishoop in order to achieve the overall objective of Kruishoop. The applicant's statement that the use of lens elements would provide much poorer results is simply speculation. Even if such speculation is correct, Kruishoop is clearly willing to accept such relatively poorer results, as Kruishoop explicitly teaches that an optical system for performing the method may comprise a plurality of lenses.

39. Fourth, the applicant argues that the combination of Kruishoop and Osborne does not teach each feature of the claims because there is no apparent rationale why the concave optical element of Kruishoop would be on an opposite side of a target relative to a beam expander and a first lens (i.e., in the optical element system of Osborne). In response, this argument is not convincing. Please note that the test of

obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183). In this case, Kruishoop desires to reflect the light rays which fall past the fiber onto a rear side of the fiber by using concave optical elements so that the maximum portion of the light rays are utilized in the curing process (Figure 2, reference numbers "S_5" and "S_6", Col.2, lines 58 – 66, and Col.4, lines 37 – 46). This goal is relevant, regardless of whether the linear focused light is provided by a plurality of mirrors or a plurality of lenses (as taught by Osborne). Therefore, when Kruishoop and Osborne are taken in combination, the examiner maintains that it would have been obvious to use such concave, reflecting optical element(s) in the process / apparatus of the combination of Kruishoop and Osborne in order to reflect any of the laser light that falls past the fiber onto the rear side of the fiber so that the maximum portion of the light rays are utilized in the curing process, thereby increasing the efficiency of the curing process. To do so, one of ordinary skill in the art would have been reasonably expected to place the concave, reflective optical elements at the location necessary to reflect the laser light that falls past the fiber onto the rear-side of the fiber. In the combination of Kruishoop and Osborne, this location is on the opposite side of the fiber from the beam expander and lenses used to focus the laser light into a linear form.

40. Regarding Claim 2, the applicant argues that neither Kato nor Ortiz teaches a plano-concave lens disposed in the required orientation relative to a beam expander. In

response, this argument is not convincing. Please note that the first lens of the optical focusing system of Osborne is a converging lens of the meniscus type (Figure 1, reference number “3”, and Col.3, lines 7 – 11). Both Ortiz, Jr. (Figures 1 and 2, reference number “42”, and Col.2, lines 27 – 30) and Kato (Figure 4A, reference number “21a”, and Col.5, lines 52 – 53) teach that lenses comprising a plano-concave lens having a planar side disposed towards a light beam source can be utilized as converging lenses. It would have been obvious to one of ordinary skill in the art to incorporate a lens comprising a plano-concave lens with the planar side disposed towards the beam expander of Osborne in the apparatus of the combination of Kruishoop and Osborne (i.e., as opposed to the meniscus type lens taught by Osborne) with the reasonable expectation of success and obtaining similar results (i.e., successfully providing a known type of converging lens in the apparatus of the combination of Kruishoop and Osborne, regardless of whether the converging lens is a meniscus type lens or a plano-concave lens). Regarding the applicant’s argument that Kato is from non-analogous art, Kato is drawn to using lenses, specifically a plano-concave lens, to focus light in a desired manner and thus is reasonably pertinent to a particular problem with which the applicant was concerned (focusing light in a given manner using a plano-concave lens disposed in a particular orientation). Additionally, the examiner notes that the plano-concave lens of Kato is orientated properly with regards to the incoming light source (i.e., with the planar side towards the source so that the beam converges – see Figure 4A).

41. Regarding Claims 7, 11, and 18, the applicant argues that Ackerman does not teach the particular dimension as claimed (i.e., a distance from the light source to the fiber of 2 m or more), and Kruishoop generally seeks to make the apparatus compact, which would appear to be contrary to providing the longer displacement as claimed. In response, this argument is not convincing. Specifically, the combination of Kruishoop and Osborne is silent regarding the relative distance between the laser source and the fiber. However, Akerman et al. teaches that, in the art of curing coatings by using a laser beam, the laser source may be placed remote from the coating location since its light output is easily transmitted long distances (page 4, lines 24 – 28). Therefore, it would have been obvious to one of ordinary skill in the art to dispose the laser source of the combination of Kruishoop and Osborne "remote from the coating location" (i.e., remote from the fiber), including at a long distance of at least 2 meters from the fiber, with the reasonable expectation of (1) success, as laser light is easily transmitted long distances, and (2) obtaining the benefits of locating the laser a long distance from the fiber, such as (a) not physically interfering with the moving optical fiber and (b) reducing the risk of contaminating the laser source with volatile components that are emitted from the fiber coating during the curing process. The exact distance between the fiber and the laser source would have been chosen by the purveyor in the art depending upon various process and apparatus constraints (e.g., where it is most feasible to mount the laser source). Simply using a distance of at least 2 m between the laser source and the fiber would not be expected to be contrary to the desire to keep the apparatus compact, as there

is no indication that a dimension of greater than 2 m is considered by Kruishoop to be too large or too great. Additionally, the examiner notes that no criticality or unexpected results have been shown by the applicant relating to the laser source – target fiber distance.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
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